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Article

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Abstract

Questionnaire measures offer a time and cost-effective alternative to full diagnostic assessments for identifying and differentiating between potential anxiety disorders, and are commonly used in clinical practice. Little is known, however, about the capacity of questionnaire measures to detect specific anxiety disorders in clinically anxious pre-adolescent children. This study aimed to establish the ability of the Spence Children's Anxiety Scale (SCAS) subscales to identify children with specific anxiety disorders in a large clinic-referred sample (n = 1438) of children aged 7-12 years. We examined the capacity of the separation anxiety, social phobia, generalised anxiety and physical injury fears (phobias) subscales to discriminate between children with and without the target disorder. We also identified optimal cut off-scores on subscales for accurate identification of children with the corresponding disorder, and examined the contribution of child, mother, and father report. The separation anxiety subscale was able to accurately identify children with Separation Anxiety Disorder, and this was replicated across all three reporters. Mother and father reported social phobia subscales also accurately identified children with Social Anxiety Disorder, although child report was only able to accurately detect Social Anxiety Disorder in girls. Using two or more reporters improved the sensitivity of the separation anxiety and social phobia subscales, but reduced specificity. The generalised anxiety and physical injury fears subscales failed to accurately identify children with the corresponding disorders. These findings have implications for the potential use of mother, father and child report SCAS subscales to detect specific disorders in pre-adolescent children in clinical settings.

Word count: 250

Key words: child; mother; father; diagnosis; anxiety disorders

Public Significance Statement

We evaluated the ability of the Spence Children's Anxiety Scale subscales to identify specific anxiety disorders in clinically anxious children aged 7-12 years. Findings provide support for the use of the separation anxiety and social phobia subscales to identify Separation Anxiety Disorder and Social Anxiety Disorder in clinical settings.

The utility of the SCAS-C/P to detect specific anxiety disorders among clinically anxious children

Anxiety disorders are among the most prevalent childhood mental health disorders (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015) and are associated with significant functional impairment and negative outcomes later in life (Bittner et al., 2007; Woodward & Fergusson, 2001). Anxiety disorders in children often co-occur (Waite & Creswell, 2014), and different anxiety disorders share some common features, including excessive anxiety or worry, physiological symptoms, and avoidance of anxiety-provoking situations or associated distress. Accurate identification of anxiety disorders and differentiation between different diagnoses is reliant on the availability of evidence-based assessment tools. Structured diagnostic interviews, such as the Anxiety Disorders Interview Schedule (ADIS-C/P; Silverman & Albano, 1996), are considered to be the gold-standard tool for identifying the presence of specific anxiety disorders in children. However, the ADIS is time consuming to complete, taking an average of 134 min where children are clinically anxious (Lyneham & Rapee, 2005), and requires clinical expertise to administer. Self-report questionnaire measures designed to detect elevated anxiety symptoms offer a time- and cost-effective alternative, and are therefore commonly used in clinical practice, both to identify specific anxiety disorders and to monitor response to treatment (Law & Wolpert, 2014).

The Spence Children's Anxiety Scale (SCAS; Spence, 1998) is one widely used questionnaire measure designed to assess anxiety symptoms corresponding to DSM-IV anxiety disorders, with child- (SCAS-C) and parent-report (SCAS-P) versions available. It comprises subscales to assess the following DSM-IV anxiety disorders: separation anxiety, social phobia, generalised anxiety disorder, obsessive compulsive problems, panic/agoraphobia, and physical injury fears (phobias). A large body of evidence has

evaluated the psychometric properties of the SCAS-C/P, providing strong support for its reliability and validity. In particular, SCAS-C/P scores have good internal consistency (Orgilés, Fernández-Martínez, Guillén-Riquelme, Espada, & Essau, 2016), and test-retest reliability (Arendt, Hougaard, & Thastum, 2014). SCAS-C/P scores correlate more strongly with measures of internalising symptoms (e.g. Strengths and Difficulties Questionnaire-Internalising scale; Child Behaviour Checklist-Internalising subscale) than measures of externalising symptoms (e.g. Strengths and Difficulties Questionnaire-Externalising scale; Child Behaviour Checklist-Externalising subscale) (Arendt et al., 2014; Nauta et al., 2004), indicating convergent and divergent validity. Discriminant validity is also illustrated in significantly higher SCAS-C/P scores among clinical than community samples (Arendt et al., 2014; Nauta et al., 2004; Spence, Barrett, & Turner, 2003; Whiteside & Brown, 2008).

Far fewer studies, however, have specifically examined the capacity of the SCAS-C/P to accurately identify children with anxiety disorders (sensitivity) and children without anxiety disorders (specificity), or the capacity of its subscales to identify children with and without specific anxiety disorders. As such, evidence relating to optimal cut-off scores on the SCAS-C/P and its subscales for accurate identification of anxiety disorders is also limited. Preliminary evidence has been reported for optimal cut-off scores on the SCAS-C/P for discriminating between a community sample and clinic-referred sample of children with anxiety disorders (Reardon, Spence, Hesse, Shakir, & Creswell, 2018).

Brown-Jacobsen, Wallace, & Whiteside (2011) report sensitivity/specificity values associated with the SCAS-C/P subscales in a small sample of children and adolescents (*n*=88, age 7-18 years), but used pre-determined cut-off scores based on normative data. Olofsdotter, Sonnby, Vadlin, Furmark, & Nilsson (2015) also examined the capacity of the SCAS-C/P subscales to identify specific anxiety disorders, and report data relating to alternative cut-off scores, but the sample only included adolescents (*n*=104, 12-18 years). Evans, Thirlwall, Cooper, &

Creswell (2017) provide evidence relating to the capacity of the SCAS subscales to identify recovery from specific anxiety disorders (*n*= 337, 7-12 years), and Whiteside, Gryczkowski, Biggs, Fagen, & Owusu (2012) specifically examined the capacity of the obsessive compulsive subscale to identify children and adolescents with obsessive compulsive disorders (clinical sample *n* =196, 7-18 years; community sample *n* = 421, 8-13 years). However, the ability of the SCAS-C/P subscales to detect specific anxiety disorders in pre-adolescent children has not been established, nor are optimal subscale cut-off scores available for this population. The clinical characteristics of pre-adolescent children with anxiety disorders differ from adolescents with anxiety disorders (Waite & Creswell), and normative data (available on www.scaswebsite.com) indicates that SCAS scores also vary with age. It is therefore likely that optimal subscale cut-off scores will differ for pre-adolescent children and adolescents.

A multiple informant approach is widely recommended in the assessment of child mental health disorders (Achenbach, McConaughy, & Howell, 1987; Wren, Bridge, & Birmaher, 2004), and parent- and child-report anxiety questionnaires are both commonly used in clinical settings. Moderate levels of parent-child agreement are typically reported for SCAS scores (Arendt et al., 2014; Whiteside & Brown, 2008), and Arendt et al., (2014) also reported moderate mother-father agreement on SCAS-P scores. Limited agreement among reporters on the SCAS indicates each reporter may provide unique information, and combining reporters may help improve the capacity of the SCAS to identify children with specific anxiety disorders. However, the benefit of combining child, mother and father reported SCAS subscales, and the optimal combination of reporters for accurate identification of children with specific anxiety disorders are not yet established.

The aim of this study was to investigate the capacity of the SCAS-C/P subscales to detect specific anxiety disorders within a large clinic-referred sample (*n*= 1438) of pre-

adolescent children (aged 7-12 years). Specifically, we aimed to i) establish the ability of each SCAS-C/P subscale to discriminate between children with and without that corresponding anxiety disorder as determined using the ADIS-C/P; ii) identify the optimal cut-off scores on the SCAS-C/P subscales to accurately identify the corresponding anxiety disorders; iii) examine the relative contribution of child, mother and father report and the optimal combination of reporters to accurately identify specific disorders. SCAS data is available for mothers, fathers and children in this study, allowing the accuracy of all three informants to be examined.

Method

Participants

Participants were children (aged 7-12 years) with a primary anxiety disorder, and their mothers and fathers. The sample was recruited as part of the large multi-site [removed for blind review] study (see [removed for blind review] for further details). Inclusion criteria for the current sample were as follows: i) the child was aged 7-12 years; ii) child (SCAS-C) and mother report (SCAS-P) data was available; iii) the child had a primary anxiety disorder diagnosis consistent with DSM-5. At the time of the assessment, diagnoses were assigned according to DSM-IV criteria, but to be consistent with DSM-5 children with a primary diagnosis of Obsessive Compulsive Disorder or Post Traumatic Stress Disorder were excluded, and children with a primary diagnosis of Selective Mutism were included. Full sample details are provided in Table 1. The sample included 1438 children (50.5% female) recruited across eight sites; father report data (SCAS-P) was available for 953 children. The most common primary diagnoses were Generalised Anxiety Disorder (42.4%); Social Anxiety Disorder (22.2%); Separation Anxiety Disorder (21.4%); and Specific Phobia (11.4%), with a mean Clinical Severity Rating (CSR) for primary diagnoses of 6.17 (SD,

1.0). Across diagnostic profiles, anxiety diagnoses included: Generalised Anxiety Disorder (75.0%); Social Anxiety Disorder (63.5%); Separation Anxiety Disorder (51.7%); Specific Phobia (49.7%); Panic Disorder with/without Agoraphobia (2.2%); Agoraphobia with/without Panic Disorder (1.6%), Selective Mutism (1.3%), Anxiety Disorder Not Otherwise Specified (1.3%). Non-anxiety diagnoses included: Attention-Deficit Hyperactivity Disorder (11.0%); Oppositional Defiant Disorder (10.6%); Major Depressive Disorder/Dysthymia (9.5%); and Obsessive Compulsive Disorder (5.9%).

Differences between children with father report data available (n=953) and those without father report data (n=485) were examined. There were no significant differences between the two subsamples on gender (X^2 = .47, p = .50), age (t[1006] = .85, p =.40), the SCAS-C/P total or subscale scores (p = .18-.99), or the presence of social anxiety disorder (62.9% vs 64.7%, X^2 = .46, p =.50). There were significant differences between children with and without father report data on the presence of separation anxiety disorder (48.7% vs 57.5%, X^2 = 9.93, p =.002), generalized anxiety disorder (77.8% vs 69.5%, X^2 = 11.96, p =.001), and specific phobias (57.6% vs 46.0%, X^2 = 15.64, p <.001), but these differences reflected negligible effect sizes (Cramer's V = .08-.11).

[Insert Table 1 about here]

Procedure

Data collected as part of the pre-treatment assessment in the [removed for blind review] study was used in the current study (see [removed for blind review] for further details). Children completed the SCAS-C (n=1438), and mothers (n=1438) and fathers (n=953) completed the SCAS-P. The Anxiety Disorder Interview Schedule (ADIS-C/P) was used to assign anxiety and comorbid diagnoses, and associated CSRs in all sites except at [removed for blind review], where the Diagnostisches Interview bei psychischen Störungen

im Kindes- und Jugendalter (Kinder-DIPS) was used[1]. All trials were approved by site-specific research ethics committees. Parents provided consent, and children provided assent.

Measures

Spence Children's Anxiety Scale child and parent versions (SCAS-C/P).

The SCAS consists of corresponding child (SCAS-C; Spence, 1998) and parent (SCAS-P; Nauta et al., 2004) report questionnaires designed to assess symptoms of DSM-IV anxiety disorders. Each questionnaire includes 38 items rated on a four-point scale (0-3; never-always), and the SCAS-C includes six additional positive filler items. The SCAS-C/P comprise six subscales addressing separation anxiety (6 items), generalised anxiety (6 items), social phobia (6 items), obsessive compulsive behaviours (6 items), panic and agoraphobia (9 items), and physical injury fears (5 items); and yields a total score (sum of responses to 38 items) and subscale scores (sum of responses to items on each subscale). In cases with missing data (<25% missing items), total and subscale scores reflect the average for completed items. Evaluation studies have provided strong support for the six-factor structure (Orgilés et al., 2016) and psychometric properties of the SCAS-C/P (e.g. Arendt et al., 2014; DeSousa et al., 2014; Nauta et al., 2004; Spence et al., 2003). The internal consistency in the current sample was good-excellent (SCAS-C, $\alpha = .91$; SCAS-P, mother report $\alpha = .88$; SCAS-P, father report $\alpha = .88$).

Anxiety Disorders Interview Schedule (ADIS-C/P-IV).

Diagnostic status was assessed using the ADIS-C/P-IV (Silverman & Albano, 1996) across all sites, with the exception of [removed for blind review], where the German equivalent, Kinder-DIPS (Schneider, Unnewehr, & Margraf, 2009) was used. The ADIS-C/P consists of independent parent and child interviews, and its reliability and validity is widely reported (Silverman, Saavedra, & Pina, 2001). The presence and severity of anxiety

[1] The main analyses outlined below were conducted separately for the total sample (n=1438), and the sample excluding sites where the Kinder-DIPS was used (n=1383). The results obtained from these two sets of analyses were consistent with each other so only the results relating to the total sample are reported here.

disorders were assessed across all sites; and all sites (with the exception of [removed for blind review]) also assessed comorbid mood and externalising disorders with this interview. Diagnoses were assigned if a child met the DSM-IV criteria, and received a CSR of 4 or above, based on composite parent and child report (see [removed for blind review] for further details). As per interview schedule guidance, where there were discrepancies between the child and parent report, diagnoses were assigned if symptoms were reported by either the child or the parent, and the higher CSR was assigned as the overall CSR. Good inter-rater reliability (kappa ≥ 0.8) for clinician assigned diagnoses within samples used in this study are reported elsewhere ([removed for blind review]).

Data analytic approach

The ability of four SCAS-C/P subscales (separation anxiety; social phobia; generalised anxiety; physical injury fears) to identify corresponding DSM-5 anxiety disorders (Separation Anxiety Disorder; Social Anxiety Disorder; Generalised Anxiety Disorder; Specific Phobia) was examined. There were not sufficient Panic Disorder (2.2%) or Agoraphobia (1.6%) diagnoses to examine the functioning of the panic/agoraphobia subscale.

Analyses examining only child- and/or mother-report SCAS subscale scores included the total sample (n=1438), and the subsample where father-report was available (n=953) was used for analyses that included father-report SCAS subscale scores.

There are different published norms and t-scores for pre-adolescent girls and boys for the SCAS (available on www.scaswebsite.com), and therefore it is likely that optimal subscale cut-off scores designed to detect the corresponding disorders will similarly vary for girls and boys. To determine whether it was appropriate to consider girls/boys separately in subsequent analyses, firstly, gender differences on these four SCAS-C/P subscale scores (independent samples t-tests) were examined for each reporter (child, mother, father) (see Online Supplement 1). Significant gender differences ($p< .05$) were observed on all child-

report subscales, three mother-report subscales (separation anxiety, generalised anxiety, physical injury fears), and the father-report separation anxiety subscale. To allow a consistent approach across analyses, girls and boys were considered separately in all subsequent analyses.

The capacity of each of the four SCAS-C/P subscales (based on child, mother and father report) to discriminate between children with and without the related anxiety disorder was examined using: i) independent sample *t*-tests (and cohen's *d*), and ii) Receiver Operating Characteristics (ROC). ROC analyses produce an Area Under the Curve (AUC) statistic, ranging from 1.0 (indicating perfect classification of children with/without the disorder) to .50 (indicating chance-level classification of children with/without the disorder). In line with previous studies using ROC analyses to examine child anxiety measures (van Gastel & Ferdinand, 2008; Villabø, Gere, Torgersen, March, & Kendall, 2012), a minimum threshold of an AUC of .70 was used to indicate that the SCAS-C/P subscale was at least moderately accurate in identifying the corresponding anxiety disorder. In cases where the AUC was >.70, the sensitivity (correct classification of children with the target anxiety disorder) and specificity (correct classification of children without the target anxiety disorder) values for alternative cut-off scores were also examined. Identifying optimal cut-off scores involves a trade-off between sensitivity and specificity. With a focus on identifying the target disorder (and not missing cases), sensitivity was prioritised, and the optimal cut-off score reflected the score with sensitivity >.80, and specificity >.70. If it was not possible to achieve this .80/.70 combination, cut-off scores with lower sensitivity values (<.80), and specificity >.60 were considered. For optimal cut-off scores, overall correct classification (i.e. number and percentage correctly classified) was also calculated.

Agreement between child-mother, child-father, and mother-father report on the four subscale scores was examined using Pearson correlations. Four logistic regressions were

then used to examine the unique contribution of child, mother and father report in identifying the four target anxiety disorders (Separation Anxiety Disorder; Social Anxiety Disorder; Generalised Anxiety Disorder; Specific Phobia). For each regression model, the corresponding child/mother/father subscale scores were entered using the block-entry method. In cases where the ROC analyses indicated that the SCAS-C/P subscale was at least moderately accurate at identifying the corresponding anxiety disorder (i.e. AUC > .70), and an optimal cut-off score was identified, the sensitivity/specificity associated with each combination of reporters was also examined. It is possible to combine information from multiple reporters in different ways. In keeping with the standard approach used to combine information from multiple reporters in diagnostic interviews, and with the aim of maximising the capacity to identify specific disorders, an 'OR-rule' was used (i.e. children who scored above the cut-off score for at least one reporter were classed as 'above the cut-off' overall). For each combination of reporters (child-mother, child-father, mother-father, child-mother-father) the following was calculated: i) the proportion of children with the target anxiety disorder who scored above the optimal cut-off score on the corresponding subscale for at least *one* reporter (sensitivity); and ii) the proportion of children without the target anxiety disorder who scored below the optimal cut-off score on the corresponding subscale for *each* reporter (specificity). The total number (and percentage) of children who were correctly classified was also calculated, i.e. children with the target anxiety disorder who scored above the optimal cut-off score on the corresponding subscale for at least one reporter + children without the target disorder who scored below the optimal cut-off score on the corresponding subscale for each reporter.

Results

Discriminating between children with and without specific anxiety disorders

Differences on SCAS-C/P subscales among children with and without the target anxiety disorder are displayed in Table 2. Mean SCAS-C/P subscale scores were significantly higher among children with the target disorder, than those without the target disorder; and this finding was replicated across reporters (child, mother, father), and gender groups. Differences between children with/without the target disorder were large across reporters for the separation anxiety subscale (d = .82-1.31); and small across reporters for the generalised anxiety subscale (d = .26- 42). Corresponding differences on the social phobia subscale ranged from large for mother report (d = .84-1.02), to medium-large for father report (d = .72-.96) and medium (d = .55-.77) for child report. Differences between children with and without Specific Phobias ranged from medium for the mother/father physical injury fears subscale (d = .52-.72) to small for the corresponding child subscale (d = .41-.43).

[Insert Table 2 about here]

ROC analyses

ROC analyses for each SCAS-C/P subscale for the three reporters (child, mother, father) are displayed in Table 3. The separation anxiety subscale (child, mother and father report) was able to accurately identify Separation Anxiety Disorders among both girls and boys (AUC = .73-.82). Optimal cut-off scores for each reporter were associated with sensitivity values >.70 (.70-.78), and corresponding specificity values >.60 (.62-.75).

The mother and father report social phobia subscale was able to accurately identify Social Anxiety Disorders among both girls and boys (AUC = .70-.77). Optimal cut-off scores for mother and father report were associated with sensitivity values of .70-.71 among girls and .66-.67 among boys, with corresponding specificity values of .69-.71 among girls and .63-.67 among boys. The child report social phobia subscale achieved an AUC >.70 among girls (AUC = .71), but not boys (AUC = .65). Among girls, the optimal cut-off score on the child report social phobia subscale achieved sensitivity of .67, and specificity of .65.

The generalised anxiety subscale was not able to accurately identify children with Generalised Anxiety Disorder (AUC < .70 for child, mother and father report). The physical injury fears subscale also failed to identify children with Specific Phobias (AUC < .70) for child or mother report. The father reported physical injury fears subscale, however, did achieve an AUC = .70 among girls (but not boys), and the associated optimal cut-off score achieved sensitivity/specificity values of .61/.71.

[Insert Table 3 about here]

Using multiple informants

Correlations between child-mother, child-father, and mother-father report on the four subscales are displayed in Online Supplement 2. Across all subscale and gender groups, mother-father agreement ranged from .43-71, child-mother agreement ranged from .35-.55 and child-father agreement from .26-.51. Mother-father correlation coefficients ranged from .67-.70 for the separation anxiety subscale to .43-.48 for the generalised anxiety subscale. Child-mother correlation coefficients were similar on the separation anxiety and physical injury fears subscales (.50-.55), and ranged from .35-.42 for the social phobia and generalised anxiety subscales. Child-father correlation coefficients ranged from .44-.51 on the separation anxiety and physical injury fears subscales, to .26-.29 on the social phobia and generalised anxiety subscales.

Table 4 displays findings from logistic regressions examining the contribution of child, mother and father report in identifying Separation Anxiety Disorder, Social Anxiety Disorder, Generalised Anxiety Disorder and Specific Phobias. Higher scores on the separation anxiety subscale for each reporter were associated with Separation Anxiety Disorder among girls and boys (Odds Ratios 1.11-1.27), indicating that each reporter made a unique contribution. The Nagerlkerk and Cox & Snell R-squared statistics indicated that the

separation anxiety model explained .35-.46 of the variance among girls, and .26-.35 among boys.

Child, mother and father reported social phobia subscale scores also each made a significant contribution in identifying Social Anxiety Disorders (Odds Ratio 1.10-1.18), and overall the model explained .25-.34 of the variance among girls, and .18-.24 among boys.

Higher scores on the generalised anxiety subscale were not, however, associated with Generalised Anxiety Disorders based on child, mother or father report, and overall the Generalised Anxiety Disorder model explained very little of the variance among girls or boys (Nagelkerk, .03/.02, Cox & Snell, .05/.04). Similarly, child reported physical injury fears subscale scores were not associated with Specific Phobias. Both father and mother reported physical injury fears subscale scores each made a significant contribution to identifying Specific Phobias among girls (Odds Ratios 1.24 and 1.12, respectively); and mother report made a significant contribution to identifying Specific Phobias among boys (Odds Ratio, 1.11). Overall the Specific Phobia models, however, explained a small amount of the variance (girls, Nagelkerk, .12, Cox & Snell, .17; boys, Nagelkerk, .08, Cox & Snell, .11).

Sensitivity/specificity values associated with using two or more reporters were calculated for subscales where optimal cut-off scores were identified for each reporter (i.e. separation anxiety subscale and social phobia subscale among girls). As displayed in Table 5, combining two or three reporters improved the separation anxiety subscale sensitivity (.88-.92), but reduced its specificity (.44-.60). This reduction in specificity was less marked for mother-father report (specificity, .57-.60), than either mother-child (.50-.52), father-child (.49) or mother-father-child (.44-.45).

Similarly, combining two or three reporters improved the social phobia subscale's sensitivity among girls (.87-.92), but reduced its specificity (.40-.56). Again, mother-father

report produced higher specificity (.56) on the social phobia subscale than other reporter combinations.

Discussion

We examined the capacity of the SCAS-C/P subscales to detect specific anxiety disorders (Separation Anxiety Disorder, Social Anxiety Disorder, Generalised Anxiety Disorder, Specific Phobias) within a large multi-site clinically anxious sample (*n*= 1438) of children aged 7-12 years. There was variation in the extent to which scores on each subscale were able to discriminate between children with and without that corresponding anxiety disorder, and the accuracy with which each subscale identified children with the target disorder.

The separation anxiety subscale score was able to discriminate between children with and without Separation Anxiety Disorder, with significantly higher scores among children with than without Separation Anxiety Disorder based on child, mother and father report (*d* = .82-1.31). This subscale also identified children with Separation Anxiety Disorder with a moderate-good level of accuracy across the three reporters (AUC=.73-.82); and the optimal cut-off scores achieved an acceptable sensitivity/specificity balance (>.70/>.60). The separation anxiety subscale's ability to accurately identify Separation Anxiety Disorders in pre-adolescent children is in line with previous illustrations of its ability to accurately identify recovery from the corresponding anxiety disorder within the same age group (Evans et al., 2017) and its stronger predictive capacity than other SCAS subscales among adolescents (Olofsdotter et al., 2015).

The performance of the social phobia subscale showed some variation across reporters. The mother and father report social phobia subscale score discriminated between children with and without Social Anxiety Disorders, with significantly higher scores among

the former (*d* = .72-1.02), and also identified children with Social Anxiety Disorder with a moderate level of accuracy (AUC=.70-.77). The optimal cut-off scores on the mother and father report social phobia subscale achieved acceptable sensitivity/specificity (for girls, .70-.71/.69-.71; for boys, .66-.67/.63-.67). Interestingly, these positive findings in relation to the parent report social phobia subscale contrast with previous findings that the social phobia subscale failed to accurately identify recovery from Social Anxiety Disorders (Evans et al., 2017). The parent report social phobia subscale's utility as an identification tool may therefore be greater than its utility to monitor treatment response. Similar to mother and father report, the child report social phobia subscale scores were also significantly higher among children with than without Social Anxiety Disorder (girls, *d* = .77; boys, *d* = .55). Child report, however, only identified Social Anxiety Disorder with an acceptable level of accuracy among girls (AUC = .71), with sensitivity/specificity values of .67/.65. Previous studies that include adolescents report positive findings in relation to the social phobia subscale's ability to identify Social Anxiety Disorders using both self-report and parent report (Brown-Jacobsen et al., 2011; Olofsdotter et al., 2015). The limited capacity of the social anxiety SCAS-C items to discriminate between a clinically anxious and community sample of pre-adolescent children is however reported elsewhere (Reardon et al., in press). It is therefore possible that pre-adolescent children, have limited ability to differentiate between developmentally appropriate and clinically significant social anxieties, but this ability improves with age.

The capacity of the generalised anxiety subscale score to discriminate between children with and without Generalised Anxiety Disorder was limited. Although child, mother and father reported generalised anxiety subscale scores were significantly higher among children with than without Generalised Anxiety Disorder, effect sizes were small (*d* = .26-.42). The generalised anxiety subscale also failed to accurately identify children with

Generalised Anxiety Disorder across reporters (AUC <.70). Doubt surrounding the generalised anxiety subscale's ability to accurately detect Generalised Anxiety Disorder is also reported elsewhere. Brown-Jacobsen et al. (2011) report poorer performance for the generalised anxiety subscale compared to other subscales in relation to the sensitivity/specificity achieved in a sample of children and adolescents; and Nauta et al. (2004) report similarly high scores on the parent report generalised anxiety subscale among children with Generalised Anxiety Disorder, as those with other anxiety disorders. Interestingly the predictive capacity of the MASC generalised anxiety subscale is similarly limited (Villabø et al., 2012). There are however also more positive illustrations of the capacity of both the SCAS and the RCADS (a derivative of the SCAS) generalised anxiety subscales to detect Generalised Anxiety Disorder (Bruce, Chorpita, Moffitt, & Gray, 2005; Ebesutani, Bernstein, Nakamura, Chorpita, & Weisz, 2010; Olofsdotter et al., 2015); but as these studies include adolescents, it is possible that the SCAS and the RCADS generalised anxiety subscales are better able to detect Generalised Anxiety Disorder in adolescents than pre-adolescent children, and that the ability to identify clinically significant levels of worry improves with age.

Given that the SCAS generalised anxiety subscale addresses anxiety symptoms that are common across anxiety disorders (general worry, worries about bad things happening, physical symptoms), it may not be surprising that its capacity to discriminate between children with Generalised Anxiety Disorder and children with other anxiety disorders is limited. Indeed, while studies examining the factor structure of the SCAS provide support for a six correlated factor model, corresponding to the six subscales (Orgilés et al., 2016), an alternative model with five correlated factors, and a higher order generalised anxiety factor has also been proposed (Nauta et al., 2004), suggesting the generalised anxiety subscale is assessing an underlying general anxiety trait that is common across disorders. In order to

develop a measure that can specifically detect Generalised Anxiety Disorder, it may be necessary to adopt a bi-factor approach, and examine the capacity of individual items or a sub-set of items that can detect variance unique to Generalised Anxiety Disorder, after the common variance (or general anxiety) across disorders is accounted for. Moreover, studies examining the reliability of the ADIS report lower inter-rater reliability for Generalised Anxiety Disorder diagnoses compared to other anxiety diagnoses (Lyneham, Abbott, & Rapee, 2007). Generalised Anxiety Disorder may be considered a less coherently defined construct than disorders that are characterised by specific or situational fears, and thus potentially harder to detect, particularly among young children. Further work is therefore needed to determine how best to maximize accurate identification of Generalised Anxiety Disorders specifically among pre-adolescent children.

The capacity of the physical injury fears subscale to identify Specific Phobias was also limited. Child, mother and father report physical injury fears subscale scores were each significantly higher among children with than without Specific Phobias, with medium effect sizes for mother and father report (*d* =.52-72), but small effect size for child report (*d* = .41-.43). Both mother and child report physical injury fears subscale however failed to accurately identify children with Specific Phobias (AUC < .70), and father report physical injury subscale only identified children with Specific Phobias with an acceptable level of accuracy among girls (AUC = .70), with sensitivity/specificity of .61/.71. The failure of the SCAS physical injury fears subscale to accurately identify children with Specific Phobias is consistent with other illustrations of its limited discriminatory capacity (Brown-Jacobsen et al., 2011; Nauta et al., 2004). Studies also indicate that internal consistency is lower for the SCAS physical injury fears subscale (Arendt et al., 2014), and phobia subscales on other anxiety questionnaires (Muris, Mannes, Peters, and Meesters, et al., 2017), compared with other subscales. Indeed, as each item on the physical injury fears subscale addresses a

different specific fear (e.g. fear of dogs, fear of the dark, fear of doctors/dentists), it may not be surprising that summing the score across these items does not discriminate between children with and without Specific Phobias. Rather than focusing on the frequency of different fears, questionnaire measures may need to assess the presence of specific fears and assess the level of impairment associated with any specific fear in order to accurately detect the presence of a Specific Phobia.

Using multiple informants

This study illustrated that child, mother and father report each made a significant unique contribution in identifying children with Separation Anxiety Disorder and Social Anxiety Disorder, and using multiple reporters improved the sensitivity of the separation anxiety and social phobia subscales. As such, if the priority is to identify children with these disorders, and not miss cases, it may be beneficial to use more than one reporter (and increase the subscales' sensitivity to > .84). Perhaps unsurprisingly, using two or more reporters did however reduce the subscales' specificity. Therefore, while using a second reporter can help identify some children who would otherwise be missed, this is at the expense of an increase in 'false positives'. This reduction in specificity was less marked for mother-father report than alternative reporter combinations, suggesting mother-father report may be the optimal combination of reporters for the separation anxiety and social phobia subscales. Given that child-mother and child-father agreement was low on these subscales, it is not surprising that combining child and parent report introduced more 'false positives', than relying on the closely related mother and father report. Moreover, diagnoses based on the ADIS are more strongly associated with parent report than child report among pre-adolescent children (e.g. Evans, et al., 2017). The dominant influence of parent report on diagnostic outcomes may therefore partly account for the stronger predictive capacity of parent report questionnaires compared to child report questionnaires. Collecting information from two parents is of

course not always practical or feasible, and in these cases, using one parent report (either mother or father) can still identify children with Separation Anxiety Disorder or Social Anxiety Disorder with an acceptable level of accuracy (sensitivity = .66 -78). It is also important to note that we focused on identifying specific anxiety disorders, and consequently we prioritised sensitivity to identify optimal cut-off scores, and we explored one approach to combining information from multiple reporters (i.e. children who scored above the cut-off for at least one reporter were classed as 'above the cut-off' overall). However, if the priority was to identify children *without* specific anxiety disorders or to 'rule out' specific disorders, it would be useful to consider alternative cut-off scores (e.g. prioritise specificity) and alternative approaches to combining information from multiple reporters (e.g. only children who score above the subscale cut-off for all reporters are classed as 'above the cut-off' overall).

Mother-father agreement was only moderate on the generalised anxiety subscale, perhaps due to the fact that the generalised anxiety items address internalising processes (rather than observable behaviours), and, as noted above, may address a less coherent construct than other subscales. Nevertheless, given the failure of the generalised anxiety subscale score to discriminate between children with and without Generalised Anxiety Disorder across reporters, it is not surprising that no individual reporter made a significant unique contribution to identifying children with Generalised Anxiety Disorder. When information from each reporter on the physical injury subscale was combined, only father report made a small significant unique contribution in identifying girls with Specific Phobias, and only mother report made a small significant unique contribution in identifying boys with Specific Phobias. These differences in the accuracy of mother and father report on the physical injury fears subscale, together with differences in optimal cut-off scores identified for mother and father report on the separation anxiety and social phobia subscales, further

highlight the importance of examining mother and father report separately when considering a multi-informant approach to assessing child anxiety disorders.

Implications

This study has implications for the potential use of the SCAS-C/P subscales to detect specific anxiety disorders in pre-adolescent children in clinical practice. Findings provide support for the use of the child and parent report separation anxiety subscale for identifying children with Separation Anxiety Disorders. Findings also support the use of the parent report social phobia subscale for identifying children with Social Anxiety Disorders, and the child report social phobia subscale for identifying girls with Social Anxiety Disorders. This study provides data relating to both mother and father optimal cut-off scores and so offers potential for application in settings where only mother or father report is available. Where multiple reporters are available, clinicians and researchers will need to weigh up the improved capacity to identify the presence of Separation Anxiety Disorder and Social Anxiety Disorder associated with using multiple reporters, against the reduced capacity to correctly identify the absence of Separation Anxiety Disorder and Social Anxiety Disorder. These findings are of particular importance to clinical settings where questionnaires measures are commonly used as a time- and cost-effective means to identify potential diagnoses. Moreover, the RCADS (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a derivative of the SCAS and items on the SCAS separation anxiety and social phobia subscales also appear on the RCADS. These findings therefore have relevance to clinical services that routinely use the RCADS where it would be possible to use the SCAS separation anxiety and social phobia subscales items to identify children with the corresponding disorders. Importantly, the study suggests that the SCAS generalised anxiety subscale and physical injury subscale should not be relied upon as measures to specifically identify children with Generalised Anxiety Disorder and Specific Phobias in clinical populations.

Limitations

There are a few limitations associated with this study. We examined the capacity of SCAS subscales to detect four anxiety disorders, but there were not a sufficient number of children with either Panic Disorder or Agoraphobia to examine the capacity of the panic/agoraphobia subscale to detect children with these disorders. Standard diagnostic interview schedules were used to assess diagnoses, but it was not possible to evaluate inter-rater reliability for clinician assigned diagnoses across all sites included in the sample. Generalised Anxiety Disorder was the most common diagnosis within the sample, and the fact that only a relatively small proportion of children (25%) did not have Generalised Anxiety Disorder may have contributed to the SCAS subscale's failure to accurately detect this disorder. Moreover, all children in this sample met criteria for at least one anxiety disorder, and therefore we were not able to examine the capacity of the SCAS subscales to discriminate between children with specific anxiety disorders and children without any anxiety disorders. Indeed, the variance on SCAS subscale scores was limited in this study, and it is likely that our results underestimate the capacity of the subscales to detect the target disorders compared to what we may expect to find in a community sample. Similarly, this study examined how well the SCAS can identify specific anxiety disorders within clinical populations, but we were not able to examine its capacity of to discriminate between children with and without any anxiety disorders.

It is also important to acknowledge that the SCAS was designed to assess symptoms consistent with DSM-IV anxiety disorders. The SCAS items addressing obsessive and compulsive behaviours are therefore not consistent with the DSM-5 classification of anxiety disorders in which Obsessive Compulsive Disorder is no longer classified as an anxiety disorder; and no SCAS item/s specifically address the newly classified anxiety disorder, Selective Mutism. Changes from DSM-IV to DSM-5 in the diagnostic criteria for anxiety

disorders were however minor, and do not alter the relevance of the other SCAS items/subscales. It will nevertheless be important for future research to examine the capacity of the SCAS (or sub-set of items) to specifically detect children with Selective Mutism. Indeed, Muris, et al. (2017) report the close association between the SCAS social anxiety subscale and a new selective mutism scale, suggesting the capacity of the SCAS social anxiety subscale to detect children with Selective Mutism warrants investigation.

This study provides support for the ability of the SCAS separation anxiety and social phobia subscales to identify pre-adolescent children with Separation Anxiety Disorder and Social Anxiety Disorder in clinical populations, and provides optimal cut-off scores for mother, father and child report. It will also be important for future research to evaluate the capacity of mother, father and child report SCAS subscales to detect specific anxiety disorders among adolescents.

References

Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin, 101*(2), 213–232. https://doi.org/10.1037/0033-2909.101.2.213

Arendt, K., Hougaard, E., & Thastum, M. (2014). Psychometric properties of the child and parent versions of Spence Children's Anxiety Scale in a Danish community and clinical sample. *Journal of Anxiety Disorders*, *28*(8), 947–956. https://doi.org/10.1016/j.janxdis.2014.09.021

Bittner, A., Egger, H. L., Erkanli, A., Jane Costello, E., Foley, D. L., & Angold, A. (2007). What do childhood anxiety disorders predict? *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *48*(12), 1174–1183. https://doi.org/10.1111/j.1469-7610.2007.01812.x

Brown-Jacobsen, A. M., Wallace, D. P., & Whiteside, S. P. H. (2011). Multimethod, multi-informant agreement, and positive predictive value in the identification of child anxiety disorders using the SCAS and ADIS-C. *Assessment*, *18*(3), 382–392. https://doi.org/10.1177/1073191110375792

Bruce, $, Chorpita, F., Moffitt, C. E., & Gray, J. (2005). Psychometric properties of the Revised Child Anxiety and Depression Scale in a clinical sample. *Behaviour Research and Therapy*, *43*, 309–322. https://doi.org/10.1016/j.brat.2004.02.004

Chavira, D. A., Stein, M. B., Bailey, K., & Stein, M. T. (2004). Child anxiety in primary care: Prevalent but untreated. *Depression and Anxiety*, *20*(4), 155–164. https://doi.org/10.1002/da.20039

Chorpita, B. F., Yim, L., Moffitt, C., Umemoto, L. A., & Francis, S. E. (2000). Assessment of symptoms of DSM-IV anxiety and depression in children: A revised child anxiety and

depression scale. *Behaviour Research and Therapy*, *38*(8), 835–855. https://doi.org/10.1016/S0005-7967(99)00130-8

[reference removed for blind review]

DeSousa, D. A., Pereira, A. S., Petersen, C. S., Manfro, G. G., Salum, G. A., & Koller, S. H. (2014). Psychometric properties of the Brazilian-Portuguese version of the Spence Children's Anxiety Scale (SCAS): Self- and parent-report versions. *Journal of Anxiety Disorders*, *28*(5), 427–436. https://doi.org/10.1016/j.janxdis.2014.03.006

Ebesutani, C., Bernstein, A., Nakamura, B. J., Chorpita, B. F., & Weisz, J. R. (2010). A psychometric analysis of the revised child anxiety and depression scale-parent version in a clinical sample. *Journal of Abnormal Child Psychology*, *38*(2), 249–260. https://doi.org/10.1007/s10802-009-9363-8

Evans, R., Thirlwall, K., Cooper, P., & Creswell, C. (2017). Using symptom and interference questionnaires to identify recovery among children with anxiety disorders. *Psychological Assessment*, *29*(7), 835-843. http://dx.doi.org/10.1037/pas0000375

[reference removed for blind review]

[reference removed for blind review]

Law, D., & Wolpert, M. (Eds.). (2014). *Guide to Using Outcomes and Feedback Tools with Children, Young People and Families*. Press CAMHS. Retrieved from http://www.corc.uk.net/

[reference removed for blind review]

Lyneham, H. J., & Rapee, R. M. (2005). Agreement between telephone and in-person delivery of a structured interview for anxiety disorders in children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *44*(3), 274–282. https://doi.org/10.1097/00004583-200503000-00012

Muris, P., Mannens, J., Peters, L., & Meesters, C. (2017). The Youth Anxiety Measure for

DSM-5 (YAM-5): Correlations with anxiety, fear, and depression scales in non-clinical children. *Journal of Anxiety Disorders*. http://dx.doi.org/10.1016/j.janxdis.2017.06.001

Nauta, M. H., Scholing, A., Rapee, R. M., Abbott, M., Spence, S. H., & Waters, A. (2004). A parent-report measure of children's anxiety: Psychometric properties and comparison with child-report in a clinic and normal sample. *Behaviour Research and Therapy*, *42*(7), 813–839. https://doi.org/10.1016/S0005-7967(03)00200-6

Olofsdotter, S., Sonnby, K., Vadlin, S., Furmark, T., & Nilsson, K. W. (2015). Assessing Adolescent Anxiety in General Psychiatric Care: Diagnostic Accuracy of the Swedish Self-Report and Parent Versions of the Spence Children's Anxiety Scale. *Assessment*, 1–14. https://doi.org/10.1177/1073191115583858

Orgilés, M., Fernández-Martínez, I., Guillén-Riquelme, A., Espada, J. P., & Essau, C. A. (2016). A systematic review of the factor structure and reliability of the Spence Children's Anxiety Scale. *Journal of Affective Disorders*, *190*, 333–340. https://doi.org/10.1016/j.jad.2015.09.055

Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*, *56*(3), 345–365. https://doi.org/10.1111/jcpp.12381

Ramsawh, H. J., Chavira, D. a., & Stein, M. B. (2010). Burden of Anxiety Disorders in Pediatric Medical Settings. *Archives of Pediatrics & Adolescent Medicine*, *164*(10), 965–972. https://doi.org/10.1001/archpediatrics.2010.170

Reardon, T., Spence, S., Hesse, J., Shakir, A., & Creswell, C. (2018). Identifying children with anxiety disorders using brief versions of the Spence Children's Anxiety Scale for children, parents, and teachers. *Psychological Assessment, 30 (10)*:1342-1355.

Schneider, S., Unnewehr, S., & Margraf, J. (2009). *Kinder-DIPS fur DSM-IV-TR.*

Diagnostisches Interview bei psychischen Störungen im Kindes- und Jugendalter. Heidelberg: Springer.

Silverman, W. K., & Albano, A. M. (1996). *The Anxiety Disorders Interview Schedule for DSM-IV –Child and Parent Versions.* San Antonio. TX: Psychological Corporation.

Silverman, W. K., Saavedra, L. M., & Pina, A. A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the Anxiety Disorders Interview Schedule for DSM-IV: child and parent versions. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(8), 937–44. https://doi.org/10.1097/00004583-200108000-00016

Spence, S. H. (1998). A measure of anxiety symptoms among children. *Behaviour Research and Therapy*, *36*(5), 545–566. https://doi.org/10.1016/S0005-7967(98)00034-5

Spence, S. H., Barrett, P. M., & Turner, C. M. (2003). Psychometric properties of the Spence Children's Anxiety Scale with young adolescents. *Journal of Anxiety Disorders*, *17*(6), 605–625. https://doi.org/10.1016/S0887-6185(02)00236-0

van Gastel, W., & Ferdinand, R. F. (2008). Screening capacity of the Multidimensional Anxiety Scale for Children (MASC) for DSM-IV anxiety disorders. *Depression and Anxiety*, *25*(12), 1046–52. https://doi.org/10.1002/da.20452

Villabø, M., Gere, M., Torgersen, S., March, J. S., & Kendall, P. C. (2012). Diagnostic efficiency of the child and parent versions of the Multidimensional Anxiety Scale for Children. *Journal of Clinical Child & Adolescent Psychology*, *41*(1), 75–85. https://doi.org/10.1080/15374416.2012.632350

Waite, P., & Creswell, C. (2014). Children and adolescents referred for treatment of anxiety disorders: Differences in clinical characteristics. *Journal of Affective Disorders*, *167*, 326-332.

Whiteside, S., & Brown, A. (2008). Exploring the utility of the Spence Children's Anxiety Scales parent- and child-report forms in a North American sample. *Journal of Anxiety*

Disorders, *22*(8), 1440–1446. https://doi.org/10.1016/j.janxdis.2008.02.006

Whiteside, S., Gryczkowski, M., Biggs, B., Fagen, R., & Owusu, D. (2012). Validation of the Spence Children's Anxiety Scale's obsessive compulsive subscale in a clinical and community sample. *Journal of Anxiety Disorders*, *26*(1), 111–116. https://doi.org/10.1016/j.janxdis.2011.10.002

Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*, 1086–1093. https://doi.org/10.1097/00004583-200109000-00018

Wren, F. J., Bridge, J. a, & Birmaher, B. (2004). Screening for childhood anxiety symptoms in primary care: integrating child and parent reports. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*(11), 1364–71. https://doi.org/10.1097/01.chi.0000138350.60487.d3

Table 1

Sample characteristics

n	1438
Site, *n* (%)	
[removed for blind review]	748 (52.0)
[removed for blind review]	400 (27.8)
[removed for blind review]	111 (7.7)
[removed for blind review]	66 (4.6)
[removed for blind review]	55 (3.8)
[removed for blind review]	29 (2.0)
[removed for blind review]	27 (1.9)
[removed for blind review]	2 (.1)
Age	
Range	7-12
Mean (SD)	9.89 (1.70)
Gender	
Female, *n* (%)	726 (50.5)
SES, *n*, (%)	
Higher/Professional[1]	600 (41.7)
Other employed	323 (22.5)
Unemployed	38 (2.6)
Missing	*467 (32.5)*
SCAS-C (child report)	
n	1438
Mean, (SD)	
Total score	36.11 (17.6)
Separation anxiety subscale	7.01 (4.1)
Social phobia subscale	6.04 (3.9)
Generalised anxiety subscale	7.51 (3.8)
Physical injury fears subscale	4.47 (2.8)
SCAS-P (mother report)	
n	1438
Mean (SD)	
Total score	36.47 (14.5)
Separation anxiety subscale	8.23 (4.1)
Social phobia subscale	8.21 (4.0)
Generalised anxiety subscale	7.54 (3.2)
Physical injury fears subscale	4.67 (2.9)
SCAS-P (father report)	
n	953
Mean (SD)	
Total score	31.18 (13.2)
Separation anxiety subscale	6.92 (3.9)
Social phobia subscale	7.27 (3.8)
Generalised anxiety subscale	6.27 (2.9)
Physical injury fears subscale	4.30 (2.7)

ADIS-C/P-IV Primary Diagnosis *n* (%)	
Separation Anxiety Disorder	308 (21.4)
Social Anxiety Disorder	319 (22.2)
Generalised Anxiety Disorder	609 (42.4)
Panic Disorder / Agoraphobia	22 (1.5)
Specific Phobia	164 (11.4)
Selective Mutism	3 (.2)
Anxiety Disorder NOS	13 (.9)
Primary Diagnosis CSR	
Mean (SD)	6.17 (1.0)
Presence of Anxiety Disorder *n* (%)	
Separation Anxiety Disorder	743 (51.7)
Social Anxiety Disorder	913 (63.5)
Generalised Anxiety Disorder	1078 (75.0)
Panic Disorder	31(2.2)
Agoraphobia	23 (1.6)
Specific Phobia	715 (49.7)
Selective Mutism	18 (1.3)
Anxiety Disorder NOS	18 (1.3)
Presence of other psychiatric disorders[2] *n* (%)	
OCD	85 (5.9)
Major Depressive Disorder or Dysthymia	137 (9.5)
ADHD	158 (11.0)
ODD	152 (10.6)

Note. SES = socio-economic status; Anxiety Disorder NOS = Anxiety Disorder Not Otherwise Specified; Panic Disorder = Panic Disorder with or without Agoraphobia; Agoraphobia = Agoraphobia with or without Panic Disorder; CSR=Clinical Severity Rating; OCD = Obsessive Compulsive Disorder; ADHD = Attention-Deficit/ Hyperactivity Disorder; ODD = Oppositional Defiant Disorder.

[1] higher / professional = managers, directors, senior officials, professional occupations
[2] Other psychiatric disorders >1%

Table 2

Differences on child, mother and father report on SCAS-C/P subscales among children with and without the target anxiety disorder

SCAS subscale	Reporter	Gender	Target disorder Mean (SD)	No target disorder Mean (SD)	*t* test (cohen's *d*)
Separation anxiety	Child	Girls	9.28 (3.76) *n* = 411	5.61 (3.55) *n* = 315	*t*(724) = 13.37*** (*d* = 1.00)
		Boys	7.94 (3.93) *n* = 332	4.90 (3.46) *n* = 379	*t*(709) = 10.95*** (*d* = .82)
	Mother	Girls	10.55 (3.33) *n* = 411	6.17 (3.34) *n* = 315	*t*(724) = 17.56*** (*d* = 1.31)
		Boys	10.03 (3.62) *n* = 332	5.85 (3.43) *n* = 379	*t*(709) = 15.80*** (*d* = 1.19)
	Father	Girls	9.03 (3.53) *n* = 252	5.27 (3.12) *n* = 223	*t*(473) = 12.21*** (*d* = 1.13)
		Boys	8.40 (3.84) *n* = 212	5.14 (3.20) *n* = 265	*t*(475) = 10.09*** (*d* = .92)
Social phobia	Child	Girls	7.48 (3.90) *n* = 458	4.71 (3.27) *n* = 268	*t*(724) = 9.80*** (*d* = .77)
		Boys	6.34 (3.90) *n* = 455	4.36 (3.33) *n* = 256	*t*(709) = 6.84*** (*d* = .55)
	Mother	Girls	9.73 (3.81) *n* = 458	5.97 (3.56) *n* = 268	*t*(724) = 13.15*** (*d* = 1.02)
		Boys	9.16 (3.74) *n* = 455	6.13 (3.45) *n* = 256	*t*(709) = 10.69*** (*d* = .84)
	Father	Girls	8.54 (3.73) *n* = 297	5.21 (3.18) *n* = 178	*t*(473) = 9.93*** (*d* = .96)
		Boys	8.19 (3.67) *n* = 302	5.64 (3.27) *n* = 175	*t*(475) = 7.50*** (*d* = .72)
Generalised anxiety	Child	Girls	8.47 (3.93) *n* = 535	6.93 (3.35) *n* = 191	*t*(724) = 4.82*** (*d* = .42)
		Boys	7.19 (3.55) *n* = 543	6.16 (3.57) *n* = 168	*t*(709) = 3.30*** (*d* = .29)
	Mother	Girls	8.10 (3.31) *n* = 535	6.93 (3.32) *n* = 191	*t*(724) = 4.18*** (*d* = .36)
		Boys	7.51 (3.17) *n* = 543	6.59 (2.83) *n* = 168	*t*(709) = 3.36*** (*d* = .31)
	Father	Girls	6.55 (2.89) *n* = 365	5.80 (2.83) *n* = 110	*t*(473) = 2.39* (*d* = .26)
		Boys	6.33 (2.84) *n* = 376	5.56 (2.76) *n* = 101	*t*(475) = 2.43* (*d* = .27)
Physical injury fears	Child	Girls	5.46 (2.65) *n*=381	4.29 (2.82) *n*=292	*t*(671) = 5.54*** (*d* = .43)
		Boys	4.45 (3.08) *n*=334	3.31 (2.48) *n*=320	*t*(652) = 5.18*** (*d* = .41)

Mother	Girls	5.74 (2.90) *n*=381	3.99 (2.52) *n*=292	*t*(671) = 8.21*** (*d* = .64)
	Boys	5.12 (2.82) *n*=334	3.55 (2.63) *n*=320	*t*(652) = 7.35*** (*d* = .58)
Father	Girls	5.15 (2.57) *n*=271	3.36 (2.40) *n*=181	*t*(450) = 7.45*** (*d* = .72)
	Boys	4.71 (2.72) *n*=278	3.34 (2.57) *n*=201	*t*(447) = 5.44*** (*d* = .52)

***p<.001
**p<.01
*p<.05

Table 3

Receiver Operating Characteristics (ROC) for child, mother and father report SCAS-C/P subscales

SCAS subscale	ROC statistics	Girls			Boys		
		Child	Mother	Father	Child	Mother	Father
	n						
Separation anxiety	SEP (positive)	411	411	252	332	332	212
	No SEP (negative)	315	315	223	379	379	265
	AUC	.76	.82	.79	.73	.80	.74
	Optimal cut score	6.5	8.5	6.5	5.5	7.5	6.5
	Sensitivity	.75	.73	.78	.73	.78	.70
	Specificity	.64	.75	.70	.62	.69	.69
	Correct classification, *n* (%)	507 (70.0)	537 (74.0)	354 (74.5)	477 (67.1)	521 (73.3)	331 (69.4)
	n						
Social phobia	SAD (positive)	458	458	297	455	455	302
	No SAD (negative)	268	268	178	256	256	175
	AUC	.71	.77	.75	.65	.72	.70
	Optimal cut score	5.5	7.5	6.5		7.5	6.5
	Sensitivity	.67	.71	.70		.66	.67
	Specificity	.65	.71	.69		.67	.63
	Correct classification, *n* (%)	481 (66.3)	515 (71.0)	329 (69.3)		470 (66.1)	312 (65.4)
	n						
Generalised anxiety	GAD (positive)	535	535	365	543	543	376
	No GAD (negative)	191	191	110	168	168	101
	AUC	.61	.62	.58	.58	.57	.58
	Optimal cut score						
	Sensitivity						
	Specificity						
	Correct classification, *n* (%)						
Physical injury fears	*n*						
	SP (positive)	381	381	271	334	334	248
	No SP (negative)	292	292	181	320	320	201
	AUC	.62	.68	.70	.60	.67	.65
	Optimal cut score			4.5			
	Sensitivity			.61			
	Specificity			.71			
	Correct classification, *n* (%)			292 (64.6)			

Note. SEP = Separation Anxiety Disorder; SAD = Social Anxiety Disorder; GAD = Generalised Anxiety Disorder; SP = Specific Phobia.
Correct classification = true positives + true negatives

Table 4

Contribution of child, mother and father reported SCAS-C/P subscales in identifying children with the target anxiety disorders

Target Anxiety Disorder		Girls				Boys			
		b (wald)	Odds ratio (95% CI)	R^2	Model	b (wald)	Odds ratio (95% CI)	R^2	Model
SEP	Constant	-3.89 (103.29***)				-3.10 (97.98***)			
	child	.13 (12.69***)	1.14 (1.06-1.22)	.35 (Cox&Snell) .46 (Nagelkerk)	$X^2(3)$ = 201.15***	.14 (18.14***)	1.14 (1.08-1.22)	.26 (Cox&Snell) .35 (Nagelkerk)	$X^2(3)$ = 144.63***
	mother	.24 (31.99***)	1.27 (1.17-1.39)			.16 (16.32***)	1.17 (1.09-1.27)		
	father	.14 (11.70***)	1.15 (1.06-1.25)			.11 (7.62**)	1.11 (1.03-1.20)		
SAD	Constant	-2.50 (62.37***)				-1.82 (39.59***)			
	child	.12 (12.37***)	1.12 (1.05-1.20)	.25 (Cox&Snell) .34 (Nagelkerk)	$X^2(3)$ = 137.19***	.11 (11.08***)	1.11 (1.05-1.18)	.18 (Cox&Snell) .24 (Nagelkerk)	$X^2(3)$ = 93.04***
	mother	.15 (16.78***)	1.16 (1.08-1.25)			.15 (17.56***)	1.16 (1.08-1.24)		
	father	.17 (18.94***)	1.18 (1.10-1.27)			.10 (6.89**)	1.10 (1.03-1.18)		
GAD	Constant	.00 (00 p=1.00)				.21 (.38, p=.54)			
	child	.07 (3.92, p=.05)	1.07 (1.00-1.14)	.03 (Cox&Snell) .05 (Nagelkerk)	$X^2(3)$ = 14.54**	.04 (1.33, p=.25)	1.04 (.97-1.12)	.02 (Cox&Snell) .04 (Nagelkerk)	$X^2(3)$ = 11.36***
	mother	.05 (1.59, p=.21)	1.05 (.97-1.14)			.07 (2.60, p=.11)	1.08 (.99-1.17)		
	father	.05 (1.05, p=.31)	1.05 (.96-.1.15)			.05 (1.19, p=.28)	1.05 (.96-1.16)		
SP	Constant	-1.09 (19.70***)				-.88 (17.96***)			
	child	.01 (.10, p=.75)	1.01 (.93-1.11)	.12 (Cox&Snell) .17 (Nagelkerk)	$X^2(3)$ = 59.65***	.07 (2.88, p=.09)	1.07 (.99-1.16)	.08 (Cox&Snell) .11 (Nagelkerk)	$X^2(3)$ = 38.97***
	mother	.11 (4.84*)	1.12 (1.01-1.23)			.11 (4.42*)	1.11 (1.01-1.23)		
	father	.21 (15.32***)	1.24 (1.11-1.37)			.09 (2.74, p=.10)	1.09 (.98-1.21)		

Note. SEP = Separation Anxiety Disorder; SAD = Social Anxiety Disorder; GAD = Generalised Anxiety Disorder; SP = Specific Phobia
***p<.001
**p<.01
*p<.05

Table 5

Identifying Separation Anxiety Disorders and Social Anxiety Disorders using the corresponding SCAS-C/P subscale with multiple reporters (child, mother, father)

	Separation Anxiety Disorder			Separation Anxiety Disorder			Social Anxiety Disorder		
	Girls			Boys			Girls		
SCAS-C/P reporter/s	Sensitivity	Specificity	Correct classification *n* (%)	Sensitivity	Specificity	Correct classification *n* (%)	Sensitivity	Specificity	Correct classification *n* (%)
Child-mother	.88	.52	528 (72.7)	.92	.50	494 (69.5)	.87	.51	533 (73.4)
Child-father	.91	.49	339 (71.3)	.92	.49	325 (68.1)	.87	.46	341 (71.8)
Mother-father	.88	.60	355 (74.7)	.84	.57	329 (68.9)	.84	.56	348 (73.2)
Child-mother-father	.93	.45	335 (70.5)	.94	.44	317 (66.5)	.92	.40	343 (72.2)

Note. Sensitivity, specificity and correct classification values calculated using optimal cut-off scores on child/mother/father report SCAS-C/P subscales reported in Table 3. Correct classification = true positives + true negatives